Abstract
An industry perspective in accelerating the adoption of leading-edge real estate analytics.

Definitive Logic
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Over the past decade, we have seen tremendous volatility in the world’s financial institutions. From stock and bond prices, to mortgage-backed securities and commodities futures, to gas and alternative energy rates, global financial stability has faced its share of significant challenges. As we follow the ebb and flow of these various financial elements, the psychological impact of this volatility is palpable. The greatest of these impacts may very well involve the class of assets that most affects our daily lives: our homes.

Media attention has been understandably focused on the challenges of the housing market - but we too should consider our focus on corporate infrastructure, such as those places where we go to work and where we get our food. How do we value the assembly plants where we build our cars and other consumer goods? How can we more efficiently manage the public sector buildings where policy is created and deliberated?

Corporate executives are the stewards of these assets – office buildings, land, vehicles, and capital equipment. They face complex decisions regarding their property, plant, and equipment, which is typically the second most expensive line item on a company’s balance sheet. A remarkable $26 trillion (USD) in value resides in today’s global commercial real estate portfolio. The global population is expected to increase by over 1 billion to an estimated 8 billion in the next ten years. As a result, the success of these companies will be predicated on an executive’s abilities to appropriately manage the real estate footprint of their workforce, production capabilities, and general operating needs. Similarly, federal, state, and local governments face increasing pressure to optimize the deployment of public-sector resources and funds.

As illustrated in Figure 1, complicating this challenge for corporate leadership is the diversity of disciplines that typically comprise the core of real estate practices. Considering this challenge, it is vital to craft a cogent real estate strategy that aligns envisioned growth with targeted investments and programs that enhance an occupant’s experience.

**Figure 1: Macro Drivers Influencing Corporate Real Estate**
Real estate portfolios go well beyond the foundation and four walls of a building. The word “portfolio” can be applied to many things, including the equipment in a property, a set of buildings on a campus, all the land holdings by a company, the natural resources consumed by buildings, and the fleet of vehicles operated by an organization, as shown in Figure 2. In this context, portfolio management is integral to the financial function of an organization, and thus should be evaluated as a strategic pillar.

Accounting for all of an organization’s assets is a herculean task when dealing with expansive balance sheets that include diverse and geographically dispersed holdings. Upon further examination, we also find that each asset possesses its own lifecycle, progressing from concept and acquisition, through commissioning, maintenance, and disposition. These lifecycles can be brief, such as with a short-term lease, or can extend into the future – as is often the case with buildings – which have useful lives of fifty years or more.

The sheer volume of transactions in a typical corporate real estate (CRE) domain makes this dynamic journey for an executive an academic challenge in trying to ascertain key performance measures within an acceptable tolerance level.

**Culturally, the business environment seeks on-demand CRE performance metrics.** Real estate analytics, operations, and finance are now interwoven in a tightly-knit matrix. In the past, it was possible for CRE executives to work in a relative silo, focused on their buildings, land, space, and related assets. Historically, aggregating spend at the portfolio level and conducting parametric modeling had been viable practices, since business executives from parallel organizations had only incrementally better methods to justify their decisions. Moreover, the collection of data, financial analysis, and the exchange of information occurred outside of rigorous information technology (IT) platforms. As a result, information simply flowed through personal and ad-hoc formats.
Enter the internet, enterprise resource planning (ERP) applications, data warehousing, and two recessions. The result is one of the largest cultural changes in corporate America: a desire to have executive decision-making of hyper-velocity, with reach-back to the underlying data set. With the jarring impact of the 2008 financial meltdown, real estate and its significance in the measurement of an organization's fiscal health has since become of paramount concern.

**The business case for investing in real estate analytics is genuine.** While the real estate portfolio appears static on paper, it is the lifeblood of our private and public organizations, the place where people collaborate and innovate, and the epicenter of where things happen in our society. In today’s marketplace, the CRE executive maintains a pivotal role as a custodian of the asset portfolio. Real estate strategic planning is the nexus between the operational world, which serves the end customer and business units, while simultaneously striving to balance the financial aspects of all unique transactions executed across the CRE lifecycle. Measuring the performance of the CRE asset portfolio allows an organization to intelligently allocate resources to critical infrastructure, dispose of excess capacity, and manage capital risk (Figure 3). Additionally, optimizing CRE spending also gives constituents the confidence that investments in other critical parts of the business are not compromised.

Improved CRE analytics can drive recurring savings of 5 to 12% a year. When developing the business case, both near- and long-term benefits should be examined. While it may take time to implement a sophisticated analytics program, immediate cost optimization can indeed be achieved by analyzing the utilization of the real estate portfolio. Many reports tout a cost reduction of $3,000 to $12,000 for each work space that is eliminated. Where a prospective company falls within that range is dependent on the composition of space relative to its type (e.g., office, warehouse, research and development), whether it is leased or owned, and the average allocation of work space for each employee.

**Space reduction is just the beginning of the potential for financial optimization.** With improved analytics, organizations can more properly predict their future utilization and can potentially defer or eliminate capital projects - *imagine having the predictive capability to jettison a capital project that costs tens of millions of dollars*. Predictive analytics also enables a prospective organization to determine if the capital program is inefficient and marred by excessive change orders or schedule delays, whether lease costs exceed market value, and whether maintenance or energy consumption costs are above industry benchmarks. Addressing these collective business drivers puts compression on the operating costs for an organization or public-sector agency.

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**Figure 3: Enabling CRE Executive Decision-Making**

- **Representative CRE Actions**
  - Dispose of space and exit expensive leases (relative to market)
  - Co-locate business functions and services to optimize space usage
  - Strategically source materials and services
  - Retrofit buildings with more efficient equipment
  - Avoid down range capital projects
  - Improve the maintenance and reliability program
  - Enhance the physical workplace for tenants
  - Create more collaborative space

**Finance**

Understand the cost optimization potential for the various asset portfolios.

**Talent**

Quantify future workplace and asset demand to support the corporate objectives, while improving client satisfaction.

**Technology**

**Strategic Planning**

**Real Estate Analytics**

**Operations**

**Enterprise Level Cost Reduction**

- Improve your space utilization
- Reduce both the cost profile for the building operations and capital expenditure associated with down range infrastructure risk
- Improve employee productivity and reduce attrition
We only need to rewind slightly in time to identify the root causes of today’s industry challenges in realizing veritable analytics. Beginning in the 1990’s and continuing up to the recent recessions, corporate America had only a limited set of options to achieve a more technology-enabled business at an enterprise level, relative to the abundant alternatives available today. Fortunately, ERP and commercial-off-the-shelf (COTS) applications have since filled the void and have built a strong ecosystem of service partners and market capabilities. These technologies have capitalized on the transition from antiquated, mainframe-based programming languages, to integrated and scalable application suites, ushering in a tsunami-sized wave of IT modernization and business process transformation.

However, real estate “big data” is impeding analytical velocity. Although not without some challenges, corporate America and public institutions have realized the value in consolidating the myriad day-to-day business transactions into a single set of applications, be it an ERP or suite of COTS products. This rationalization of technology platforms holds true for many CRE executives in their migration to SAP®, Oracle®, IBM® TRIRIGA®, Maximo®, or similar applications, with the intent to manage the various disciplines in the real estate and asset management lifecycle.

With the plethora of new technology has also come the well-documented “big data” problem, perhaps more appropriately expressed as data denormalization. In many cases, CRE executives are not exempt from this challenge, as they sit at the crossroads of several information pathways in their respective organizations. It is not unusual for an organization to have implemented enterprise-level applications connected to specific best-in-class software. Append building control systems, mobile devices, online portals, and local user applications (i.e., Microsoft Excel), and you now have a distinctly hybrid information architecture.
The denormalization of information starts with a CRE “request.” Traditionally, it is initiated by a user – a space, work, or capital project request, for example. The fulfillment of that request can interact with many actors, traverse multiple sub-processes, and touch multiple systems. Each activity in the process usually enriches the overall data set, amplifying the original request, whether processed manually or through automation (Figure 4). Let’s consider a scenario with a capital project. It is plausible that the initially budgeted funds may exist in an ERP, the invoices from the contractor are located in best-in-class software, the design documents are housed in a separate knowledge management system, and the evaluations of the contractor performance are contained in offline spreadsheets. This data alchemy of the disparate various sources of capital project information is just one representative illustration of the denormalization process afflicting CRE executives.

**Simple Steps to Implementing a CRE Analytics Program**

As a society, the way we consume information and engage with technology on a daily basis is becoming more simplified. The behavior of companies and large public-sector agencies parallels the way the average person thinks. At a corporate level, the democratization of data is being fostered by the likes of multiple visualization and analytical tools, like SAS®, Google Earth™, Tableau®, SAP® Business Objects, Apache™ Hadoop®, etc. The analytics revolution is upon us; however, the real challenges are concealed in this new wave of literature, articles, and apps, which divert our attention from the core solution.

As shown in Figure 5, optimizing CRE performance requires accounting for the five underlying tiers of the analytical arc. As one traverses up the arc, the complexity in each tier increases, as visually indicated by the widening layers. As this is inherently a cohesive process, a fissure at any seam inhibits or greatly compromises the CRE performance layer. However, a combination of good master data, sound business processes, clean transactional data, and the right algorithms can create the proper framework for managing performance.

Too often, a solution tries to address only one or two layers of the analytic arc, and thus leaves an organization in a position of re-work and re-implementation. For example, a system surrounded by poor processes creates equally poor transactional data. Extending that logic further, inaccuracy of the digital inventory of a real estate portfolio makes it unlikely that a sophisticated analytics layer and modernized business processes can push the organization towards a meaningful predictive capability.

**Assessing your organizational maturity is the first step in establishing a CRE analytics capability.** In the last several years, the market has seen an explosive growth in the appetite for smarter, connected buildings, with a multidimensional representation of assets: Building Information Models (BIM); modulating complex commercial Financial Accounting Standards Board’s (FASB) lease accounting regulations;
tracking carbon usage; and being more efficient in the use of capital and maintenance budgets to manage aging infrastructure.

By some accounts, capabilities in the market are exceeding organizational demand – essentially, there are far more technology options than ever before and the permutations of potential integrations are mind-bending. So how does one determine a path forward? The first activity is to assess one’s maturity relative to the analytical arc. Upon completing the assessment, developing the governance model to implement the analytical framework is vital – having a formal structure to engage key stakeholders and those who own the various systems and data across the organization is an important criterion for success.

Understanding Your Technology Options

In light of the challenges faced in the present-day realm of corporate real estate, a comprehensive remedy to the pain points described in this paper is integral to effective portfolio management. Such a solution must be mindful of the continual evolution of the real estate landscape, subject to influences by the technological revolution and dynamics of policies, client needs, and environmental considerations.

As such, no off-the-shelf solution exists in the form of a single software program or tool. Rather, success can be fostered through a symphony of enhancements in the approach to business intelligence, analytics, and technology, combined into a comprehensive solution that is flexible, tailored, and proactive.

As displayed in Figure 6, we segment the implementation process to realize CRE analytics into seven (7) major stages:

- **Identify Data Sources** to define what information is needed to serve as the input for subsequent stages.
- **Collect and Integrate Data** to extract and collate data in preparation for analysis and reporting.
- **Prepare Data** to cleanse and transform raw data into meaningful information.
- **Analyze Data** to detect patterns and trends that help to make informed decisions.
- **Report and Visualize Data** to provide tabular and textual output (reports) as well as graphical output (dashboards, scorecards, and maps) that help users quickly generate and consume information.
- **Create Predictive Models** to forecast scenarios around space utilization, capital risk, spending cycles, and sustainability.
- **Evaluate and Improve** the methods, from data identification through information delivery.

With the goals, considerations, and approach in mind, an organization can begin to build their CRE analytics framework from the foundation up. An enterprise solution consists of establishing the Information Architecture to handle information flow, and a Security layer, dedicated to the safeguarding of that information. Products designed to maximize user-centric accessibility, such as Maps, Reports, Dashboards, and Scorecards, are further supported by Data Quality, Data Management, and Data Governance activities.

An agile approach is fundamental to creating a business intelligence platform. One key factor is examining a “build vs. buy” decision to determine if the solution should be custom developed (build) or acquired through commercial-off-the-shelf products (buy). In most cases, we recommend a hybrid solution of integrated COTS products to deliver standard functions with custom-built components and specific functions unique to the organization. This ends up being a very practical perspective as all companies and institutions are invested in at least some level of technology. In any case,
using an incremental and iterative development approach provides the most benefit by delivering functionality early and often. The agility of this approach leads to increased maturity more quickly than using traditional approaches, like the waterfall methodology.

Current technology trends are also unleashing exciting, cloud-based solutions that provide client, web, and mobile options. Cloud-based solutions, sometimes referred to as "off premise" platforms, ease deployment and maintenance concerns. The result: a user-community with a robust access model capable of delivering consistent and reliable information anywhere, anytime.

With the advent of new technologies and building capabilities, CRE strategic planning must remain nimble in adapting to emerging concepts - such as the evolving construct around the Building Internet of Things™ (BIoT™). These trends place a premium on information integrity from the building level up to the enterprise. Properly harnessing the proliferation of this CRE data into formal analytical methods will be crucial to a real estate organization’s ability to manage cost, predict utilization and occupancy, and enable tenant connectivity across its portfolio. These trends place new demands on space utilization, connectivity, and social responsibility. Integration of effective tools and strategies into a business planning model are needed to drive long-term organizational initiatives, while ensuring the relevancy of the organization and its practices in the real estate landscape of today and beyond.
References

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